

REMARKS

Applicants respectfully request reconsideration and withdrawal of the objections and rejections set forth in the Office Action.

Drawings

Applicants request that the Examiner withdraw the objections to the drawings. Figures 9 and 10 are referred to in the specification as a conventional flue gas treating system. These conventional systems may or may not qualify as prior art depending on where and when they were used and disclosed. Thus, applicants request that they be allowed to refer to the drawings as "Related Art."

Specification

Applicants wish to thank the Examiner for the examiner's amendment regarding the status to Application No. 09/058,965. With respect to the use of brackets, applicants wish to request the Examiner to withdraw this rejection. A search of the USPTO web pages reveals, as of June 11, 2003, that 2,184 patents have issued with at least one bracket in the abstract, thereby indicating the printers are capable of printing abstracts with brackets. Moreover, the printer should only delete material when this material is explicitly and properly amended by the applicants. Finally, as of the end of July 2003, the PTO will no longer be using brackets to amend the specification, or will be using double brackets, so there should be no confusion when the abstract is ready for printing. (See Office of Patent Legal Administration, Pre-OG Notice, Amendments in a Revised Format Now Permitted, dated January 31, 2003.)

Rejections Under 35 USC § 112

Claim 28 has been amended to overcome the current rejection for indefiniteness, which was misnumbered as being claim 27.

The subject of claim 1 concerns a process for denitration and desulfurisation of flue gas in which ammonia is used for denitration and in which flue gas leaving the denitration step is brought into contact with an absorbing slurry in an absorption tower for

desulfurisation. The present invention enhances the treating performance of flue gas while at the same time not compromising cost and maintainability.

The performance of a treating process of the above kind can be considerably increased by means of supplying more ammonia than necessary for denitration so that excess ammonia remains in the flue gas when it enters the desulfurisation step. This, however, entails the problem of ammonia leaking into treated flue gas and being released into the environment.

The inventors found that the amount of ammonia released can be considerably reduced by preventing ammonia initially absorbed in the absorbing slurry of the absorption tower from reversely being released into the flue gas further downstream. To achieve this on the downstream side of the region of the absorption tower in which the flue gas is brought into contact with the absorbing slurry, a region is provided in which a liquid having lower pH than the absorbing fluid is sprayed. Due to the higher acidity of this liquid, ammonia absorbed in the slurry is not so easily released into the gaseous phase. Rather, ammonia remaining in the flue gas is absorbed so that the treated gas leaves the flue gas treating system substantially free of ammonia. The dramatic effect of the invention was confirmed by means of model calculations which suggest that about 90% of the ammonia can be removed through this novel process. Thus, the new process is not only surprisingly simple but also highly effective, and not suggested by the prior art.

The spraying of a liquid of high acidity to optimize the removal of ammonia cannot be derived from any of the documents cited by the examining division, neither alone nor in combination. This feature of the process was originally recited in claim 18, which has been cancelled and substantially added to claim 9. Applicants urge that the rejections made by the Examiner do not establish a *prima facie* case of obviousness with respect to this invention.

For first rejection for obviousness, the Examiner cites pages 1-5 and Figure 9 of the specification in light of US Patent No. 5,024,171. Although applicants do not admit that any section of the specification is prior art, assuming *arguendo* that pages 1-5 and Figure 9, are prior art, the combination of this description and US '171 does not render the invention obvious. There is no teaching or suggestion in US '171 of spraying the flue gas with a liquid having a higher acidity than the absorbing fluid downstream of the desulfurization step and in

the absorption tower. This distinction was recognized by the Examiner, who did not reject claim 18 over the present specification in view of US '171. As applicants have amended claim 9 to add in recitations based on former claim 18, this rejection has been rendered moot and should be withdrawn. Moreover, US '171 cautions against the use of too much ammonia, as well as too little. See column 1, lines 48-50. The injection of ammonia is taught to be a parameter demanding "careful control . . . of the mass flow rate." Specifically, the mass flow rate is either 2.0 to 2.2 times the molar mass flow rate of the sulfur trioxide or stated alternatively, the mass flow rate of the ammonia is such that the normal stoichiometric ration of ammonia to sulfur trioxide is from 1.0 to 1.1. See, e.g., column 2, lines 45-53, column 3, lines 4-10, column 6, lines 11-21, column 7, lines 35-47. This teaching would not lead one to the present invention, which does not require such parameters.

The English translation of DE G93 19017.4 U1 does not remedy the deficiencies of US Patent No. 5,024,171. As discussed before, US '171 is limited to applying ammonia to a very specific set of parameters. There is no teaching in any of these references of spraying the flue gas with a liquid having a higher acidity than the absorbing fluid. Therefore, the present invention is not obvious.

Finally, for the reasons given above, the combination of the *Chemical Engineer's Handbook* does not render the invention obvious. The teaching of shell and tube-type heat exchangers does not suggest the process of spraying the flue gas with a liquid having a higher acidity than the absorbing fluid.

Therefore, applicants maintain the rejections for obviousness are improper and respectfully request their withdrawal.

Conclusion

The present application is now in condition for allowance, and favorable reconsideration thereof is respectfully requested.

If the Examiner believes that an interview would advance prosecution of the application, he is invited to contact the undersigned by telephone.

If there are any unaccounted fees due in connection with the filing of this Amendment, please charge the fees to our Deposit Account No. 19-0741.

Respectfully submitted,

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Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 19-0741 for any such fees; and applicant(s) hereby petition for any needed extension of time.